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March 5, 2017

Dr. Scott Lyons and Dr. James Navalta
Co-Editors-in-Chief
International Journal of Exercise Science
1906 College Heights Blvd. #11089
Bowling Green, KY 42101-1089

RE: The original work entitled "Students' Perceptions of an Applied Research Experience in an Undergraduate Exercise Science Course."

Dear Dr. Lyons and Dr. Navalta,

Please accept a revised submission of our original work, entitled "Students' Perceptions of an Applied Research Experience in an Undergraduate Exercise Science Course," for evaluation to be published in the International Journal of Exercise Science. The following individuals are authors/co-authors: Regis Pearson, Dr. Jason Crandall, Alyssa Dispennette, and Dr. Jill Maples. The purpose of our manuscript is to describe the rationale for and implementation of an applied research experience into an exercise science curriculum and to evaluate exercise science undergraduate students' perceptions of an applied research experience. We believe that this topic will be of interest to the International Journal of Exercise Science targeted audience.

We greatly value the feedback provided by reviewers and have attempted to comprehensively address all their comments. Attached to this cover letter is an outline describing how we addressed each comment. Due to the extensive editing of the manuscript that was required to address all feedback provided by reviewers, we have not submitted a red-lined draft of manuscript containing all tracked changes. Our rationale for this decision is that a red-lined draft of the manuscript would be incredibly difficult to follow. However, we would be happy to supply this upon request.

Please let us know if you have any questions and/or need any additional information/documentation.

Sincerely,

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Reviewer #3

Reviewer Comments - Reviewer #3:

- In the discussion portion of the Abstract it reads “very beneficial” and “very time consuming,” the use of very in both instances is not needed.
- In the second sentence of the Introduction consider including a colon after “American colleges and Universities by(:).”
- Step 5 in Methods, for consistency, consider replacing “finally” with thirdly.
- In the “outcome measures” portion of the Methods, second paragraph, “Student Perceptions of Instruction Survey” should be removed, as the SPIS abbreviation has previously been established (additionally, remove the parentheses around SPIS).
- The first sentence of the discussion should be amended; “in different ways” is not necessary, as you then proceed to tell the reader the ways in which they are different.
- In the third paragraph of the discussion, first sentence, if you are referencing a quote from a student quotations are needed. Additionally, the word “was” is used twice in the same sentence; consider rephrasing.
- In the fourth paragraph of the discussion, first sentence, the word “some” is not needed.
- The last paragraph of the discussion, second sentence, the word “where” should be “were”
- In the last paragraph of the discussion, third sentence, the word “much” is not needed.

Authors’ response: Thank you for taking the time to review this manuscript. All grammatical suggestions were incorporated, however, due to extensive edits made in order to comprehensibly address all reviewer comments, several of these revisions are not readily apparent.

Reviewer #4

Reviewer Comments - Reviewer #4 - General Comments: Overall the authors should be commended for introducing a high impact learning experience into the undergraduate classroom and attempting to analyze and quantify the results. This type of work is important to improve overall student learning and the more data there is to support it, the more ammunition faculty will have to gain support from administrators for this type of time consuming and engaging teaching.

Authors’ Response: Thank you for taking time to review this manuscript. We appreciate that you noted the importance of this type of study for the improvement of student learning.

Reviewer #4 - General Comments Continued: However, the primary purpose of the study, exploring the perceptions of students in this type of course, was not well developed in the introduction or throughout the paper. The primary content was about the benefit of developing hard and soft skills, which was not assessed in this study. The authors would strengthen their paper considerably by exploring more literature about student perceptions of different learning experiences and how those perceptions alter motivation and interest in the classroom – an easier link given their assessment tools. In addition, the discussion focused significantly on the hard and soft skills students learned and the connection between student learning and the research experience yet neither the purpose nor data really address this

connection. Given the importance of this type of work for improving the learning experience of students and the clear effort the authors put in to assess this initiative, I would recommend significant revisions in hopes that the authors can present a more connected background-purpose and stick with their measured outcomes throughout the discussion.

Authors' Response: The primary purpose of the study has been expanded to 1) to describe the rationale for and implementation of an applied research experience, tailored to enhance the development of hard and soft skills, into an Exercise Science (EXS) curriculum and 2) to evaluate EXS undergraduate students' perceptions of the applied research experience. The mention of hard and soft skill development has been more thoroughly developed and related to the first aim of the paper (to describe the rationale for and implementation of an applied research experience, tailored to enhance the development of hard and soft skills, into an Exercise Science (EXS) curriculum). Regarding the primary content of the introduction, edits have been made to address the importance of student perceptions regarding educational strategies. We now emphasize that the incorporation of applied research experiences (in traditional STEM courses) have been examined previously, but to a lesser extent in the field of exercise science. The entire manuscript underwent significant revisions to address the connection of the background information and the purpose of the study. More emphasis has been placed on the importance of student perceptions of educational experiences and positive outcomes as a result of positive student perceptions.

Reviewer #4 Comments Continued regarding the Abstract:

Abstract: The first sentence suggests this study is about skill development – there is not a clear connection between the first sentence as background and the purpose statement.

- “perceptive” should be “perception”
- Second to last sentence – subject verb agreement
- Last sentence suggests hard and soft skills were assessed in this study.

Authors' Response: All grammatical errors were corrected, while editing the entire abstract in order to avoid suggesting hard and soft skills were assessed.

Reviewer #4 Comments Continued regarding the Introduction: There are some breaks in logical progression as the authors build their case for the applied research learning experience.

- First paragraph, pg 2, last sentence – the authors first need to establish from the literature that participating in an applied research experience helps build hard and soft skills.

Authors' Response: These suggestions were incorporated when making edits. Briefly, the logical progression through the introduction has been corrected to follow: Benefits of high-impact practices in the classroom, how these practices aid in student development, incorporation of these practices within the collegiate course load, how students' perceptions affect performance, and purpose of the study.

Reviewer #4 Comments Continued regarding the Introduction: 3rd paragraph – the authors argument would be strengthened if they could establish that giving students choice in an applied research setting increases student investment and motivation. This is an area that could really strengthen the author's paper.

Authors' Response: Thank you for the suggestion to emphasize that giving students a choice in research topic may allow for increased motivation and student investment. Author's addressed this comment by adding the sentence, “Allowing flexibility in the research topic selection was intentional, as previous

studies have indicated that providing students with a large variety of topic choices, likely results in students being less likely to randomly select a topic or feel pressured to select a topic in which they are less interested (11)” to the Implementation of the Applied Research Experience section in the Methods.

Reviewer #4 Comments Continued regarding the Introduction: Final paragraph – the introduction primarily focuses on all of the skills students acquire from high impact learning strategies. Consequently, the purpose does not naturally flow from the rest of the introduction. The authors would strengthen their paper if they could demonstrate that despite these benefits, there is a gap in knowledge about what students think about these types of courses, perhaps exercise science students specifically, and that what students think about the learning strategies also impacts learning outcomes and/or skill acquisition.

Authors’ Response: As mentioned previously, we have adjusted the purpose statement of the manuscript which allowed us to highlight the benefits of incorporating an applied research experience into an undergraduate curriculum, yet not imply that we have measured these specific benefits. Additionally, we edited the manuscript to highlight that there is a lack of research devoted to examining the students’ perceptions of applied research experiences specifically in the field of exercise science. Additionally, support was added addressing how student perceptions impact learning outcomes.

Reviewer #4 Comments Continued regarding the Methods Section: g 3, 1st paragraph – subject verb agreement under bullet point 4.

Authors’ Response: Subject verb agreement was corrected.

Reviewer #4 Comments Continued regarding the Methods Section: Step 1 - This idea of giving choice is important and could be highlighted further in the introduction. Giving students choice gives a greater sense of autonomy and improves student interest and motivation. This reasoning could be expounded upon further and would strengthen the paper.

Authors’ Response: Edited sentence to read, , “Allowing flexibility in the research topic selection was intentional, as previous studies have indicated that providing students with a large variety of topic choices, likely results in students being less likely to randomly select a topic or feel pressured to select a topic in which they are less interested (11)”.

Reviewer #4 Comments Continued regarding the Methods Section:

- Step 2, last line – Delete “were”

Authors’ Response: Corrected.

Reviewer #4 Comments Continued regarding the Methods Section:

- Step 4, last line – “ and identification of participants” – change to “possible subject population” or something similar. The use of the word “identification” is redundant.

Authors’ Response: Corrected.

Reviewer #4 Comments Continued regarding the Methods Section:

- Pg 4, 1st paragraph – the authors need to explain why the survey was administered at different times points. Perhaps the study was designed after the initiative was started. The authors should state that up front and acknowledge it as a limitation.

Authors' Response: This information regarding time points of data collection was edited in an effort to increase clarity. Additionally, authors addressed this concern in the discussion as a limitation of the study.

Reviewer #4 Comments Continued regarding the Methods Section:

- Statistical Analysis – What was SPSS used for? The only data presented are percentages of a given answer. There really is no statistical analysis.

Authors' Response: Edits were made to correct this. Additionally, we have included a more detailed description of how the data was evaluated. The following is now included in the Methods section of the paper: “The qualitative data were evaluated independently by three researchers. Each individual examined the data, interpreted the data forming an impression, reported their impressions from the data, and noted themes. After the independent analysis, the researchers then compared their results to mutually agree on common themes in the students’ responses.”

Reviewer #4 Comments Continued regarding the Results:

Results:

- It would seem that the ARES survey was the primary assessment tool and as such, the data from the ARES should be presented first to highlight those results as the primary findings.
- How many subjects completed the SPIS?

Authors' Response:

Regarding the ARES – We no longer refer to this set of questions as the ARES. Based on other reviewer comments, we felt that identifying this set of questions as the ARES suggested this was a validated survey, which is not the case. Now we simply refer to our survey of students as “questions administered to assess student perceptions of an applied research experience.” We provide a more thorough description of the questions and provide better rationale for the inclusion of certain questions. The following information is now included in the *Assessing Students' Perceptions of the Applied Research Experience* section of the Methods: “Recent work by Visser-Wijnveen, van der Rijst, and Van Driel (2016) indicates that the measures of *quality, beliefs, motivation, reflection, participation, and current research*, accurately capture a student’s perception of an applied research experience (19). Consistent with these findings, we constructed 14 questions to assess students’ perceptions of the applied research experience, tailored to EXS undergraduate students (See Table 1).”

The SPIS survey was excluded from the manuscript because the questions were not specific to gathering information regarding the perceptions of students in response to the applied research experience.

Reviewer #4 Comments Continued regarding the Results:

- 1st paragraph, 2nd sentence. This is a very general statement. Can these results be quantified by percent of respondents as the authors did for the ARES?

Authors' Response: The SPIS survey was excluded from the most current manuscript.

Reviewer #4 Comments Continued regarding the Results:

- I would suggest putting the questions from the survey stated in the first paragraph in quotations.

Authors' Response: Edits were made in which this verbiage was retracted.

Reviewer #4 Comments Continued regarding the Results:

- Table 2 is interesting data but the authors fail to connect the data to the main purpose of the study (other than the 3rd question).

Authors' Response: Authors' edits included the addition of multiple tables/ figures, while retracting some of the existing ones. We made a point to connect all tables/ figures to the main purpose/s of the study.

Reviewer #4 Comments Continued regarding the Results: The authors need to include more detail on the survey itself. I would assume from the data that only three responses were available: “below average”, “average”, and “above average”. If this is the case, combining “average” and “above average” does not give a clear picture of the data as the “average” response is truly neutral and there is no clear indication of how many students really answered positively with an “above average” response. If there are only three options, the authors should present the percent response for each option or at least 2 of them, “average” and “above average”.

Authors' Response: Edits included the further explanation of the specific survey questions in the Methods section (See Table 1), the format of said questions (See Table 1), and specific percentages of student responses per option (See Table 2 and Figure 3). Additionally Tables 3 and 4 have been added to allow readers to grasp a greater understanding of an overall view of the students' responses.

Reviewer #4 Comments Continued Regarding the Discussion:

Discussion

- The discussion is filled with conclusions that are not supported by the study design nor the data.
- For example, “Many students noted that because of the many expectations put upon them, they were forced to learn quickly and found the learned soft and hard skills useful”. This statement suggests the authors know that students did indeed learn soft and hard skills but that was not assessed in this study or if it was, it was not reported clearly.
- One other example - “Although the relationship between student learning and the applied research experience was strong in this study, students did express some concerns.”. Was the relationship between student learning and the research experience strong? Did the authors assess student learning and correlate learning outcomes to the scores on the ARES or SPIS or are the authors assuming a high level of learning? My guess is that the students did indeed learn but if this was not assessed, these types of statements should not be made or the authors should be clear that they are speculating.
- These examples abound in the discussion and should be significantly addressed.

Authors' Response: We have addressed this comment by extensively editing the Discussion section so that it is consistent with the updated purpose/s of the paper and the data in the Results section. Inferences made by independent researchers are now supported with data represented in the Results section (yes or no, Likert scale with optional comments, and open-ended questions). Soft and hard skills were not

specifically assessed, edits have been made to more clearly represent what was measured, more actually interpret this data, and better communicate inferences noted by researchers of the students' perceptions of an applied research experience.

Reviewer #1 - SECOND REVIEW

Reviewer Comments - SECOND REVIEW:

- Decision to forgo suggested revisions should be justified.
- Grammatical errors continue to remain throughout manuscript.
- Please elaborate on the creation of the ARES survey.
 - As this is a new tool, please address validity and reliability.
 - Please provide the number of items and examples of items.
 - Define the Likert scale used (“responses ranging from __ to __” and the dialogue responses to which each scale number corresponds to).
 - How were the questions selected?
 - Who collaborated in the creation of this measurement tool?

Authors' Response: We have responded to all reviewer comments and have addressed grammatical errors. Significant revisions to the Methods section have resulted in a more complete description of questions that assess student perceptions of the applied research experience.

Reviewer #1 - Reviewer Comments Continued- SECOND REVIEW – Regarding the Methods: Who were the researchers who analyzed the SPIS? Were they free of bias when doing so?

Authors' Response: Authors' added the following statements were added to the Methods section to address this comment, “The qualitative data were evaluated independently by three researchers. Each individual examined the data, interpreted the data forming an impression, reported their impressions from the data, and noted themes. After the independent analysis, the researchers then compared their results to mutually agree on common themes in the students' responses.” Of note, a fourth author was added to the project after the second review. We requested the help of this individual to serve as the “third researcher” to help with data analysis. This graduate student was not initially involved in the data collection and her inclusion in the project was to ensure an unbiased analysis of the data.

Reviewer #1 - Reviewer Comments Continued- SECOND REVIEW – Regarding the Methods:

- Statistical analysis may be run comparing participants from different semesters to strengthen your results, though you may not find significance with the small number of responses.

Authors' Response: Additional statistical analysis was not sought due to the sample number and nature of the manuscript.

Reviewer #1 - Reviewer Comments Continued- SECOND REVIEW – Regarding the Results:

- Results section should be categorized by survey.
- To which survey does Table correspond? Please label accordingly.
 - You state that the ARES survey is scored on a Likert scale yet you provide data on yes/no answers in Table 1. Please clarify.

Authors' Response: We updated all tables /charts /graphs with correct labels and agreeing descriptions in the text body. The retraction of the SPIS survey and renaming of the ARES resulted in the responses from only one survey being displayed and ultimately arbitrarily referred to as an “online question set”.

Reviewer #1 - Reviewer Comments Continued- SECOND REVIEW – Regarding the Discussion:

- Your discussion section states “skills were greatly tested throughout this experience, but in the process students discovered a better understanding of the research process and an overall understanding of the EXS field”
 - The data presented do not equate to this broad conclusion. We’re these specific questions asked on the ARES survey?
- Many inferences are made throughout the discussion section which are not supported by the reported data in the results section.

Authors' Response: We have addressed these comments by extensively editing the Discussion section so that it is consistent with the updated purpose/s of the paper and the data in the Results section. Inferences made by independent researchers are now supported with data represented in the Results section (yes or no, Likert scale with optional comments, and open-ended questions).